EGUsphere, referee comment RC2
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Comment on egusphere-2022-255

Anonymous Referee #2

Referee comment on "Multiscale lineament analysis and permeability heterogeneity of fractured crystalline basement blocks" by Alberto Ceccato et al., EGUsphere, https://doi.org/10.5194/egusphere-2022-255-RC2, 2022

The authors present a study of the fracture patterns in onshore exposures of the Rolvsnes granodiorite. The methodology adopted is state-of-the art and includes some novel features that could eb highlighted further in the text. The results are well described and illustrated in figures including the supplementary files. The discussion of biases in the data is useful and the authors conclusion that they have identified a multiscale fracture hierarchy is justified. The study will be interesting to those working on fracture reservoirs generally and adds to our growing knowledge of fractured basement systems.

A few suggestions and comments on specific items in the manuscript.

Line 79-80. I suggest to moving this paragraph up to the start of this section because it a) discusses previous work and b) gives a statement of the problem and need for further constraint. This reorganisation would mean that this section on 'Structure of the paper' finishes with the lines that are now 76-78 which highlights the contribution in this study. Furthermore I suggest combining the 2 paragraphs in lines 70-78 together into 1.

Line 115-118 - So what? Explain why are you telling the reader this. Can the study of the Rolvsnes basement tell you something about the Utsira high? If so what can it tell us?

Lines 150-155 - One of the criticisms of box counting is that the results can be biased if the exposure boundaries that are different from the sample boxes. Reliable results can be obtained where the boxes are entirely within the mapped data - How did you take this into account given the exposures in the study area are a series of islands? Did you test to see if the results are reflecting the shape of the islands rather than the fractures within them?

Line 239. It was claimed in the abstract that the workflow presented is novel. Could the authors explain here or at the start of this section what is novel here - as opposed to 'State of the Art'. To me the workflow represents current best practice but I struggle to see where the novelty lies.

Line 373 spelling of 'and' in subtitle.

Line 398 Have you tried plotting rose diagrams that are length weighted? This can bring out dominant trends.

Figures and Figure captions
LIne 810 - What does GFZ stand for? - reader shouldn't have to refer to the text for the abbreviations in the figures.

Line 825 - What do the abbreviations CoV and V* stand for? Reader shouldn't have to refer to the text.

Figure 9. it would be useful here to add a reminder of the set numbers - the text (c. Line 365) discusses the fractures by set number but only types appear on the Figure